

SIERRA04-0982Y3 High-Efficiency - PAG R134a / R513A / R1234yf 48-72 VDC VARIABLE SPEED



Brushless DC Variable Speed Compressor Technical Data Sheet

General Information

Compressor w/Fittings Part Number	SIERRA00247	#10 MIO Suction - #8 MIO Discharge
Compressor Drawing	DCMX27-002	#10-32 Threaded Terminal Connections
Controller Options (37-60V)	025F0158, 025F0152	
Wiring Diagram Drawing	DEM00010	
Controller Options (60-97V)	025F0164, 025F0139	
Wiring Diagram Drawing	DEM00021	

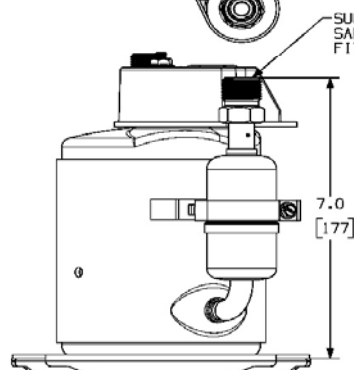
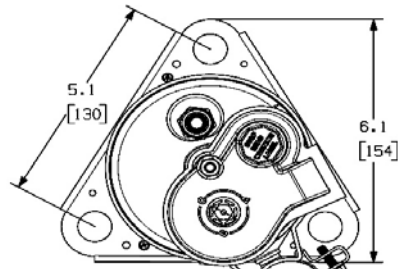
Application Information

Application	HBP, A/C
Refrigerant	R134a, R513A, R1234yf
Evaporator Temperature Range	-23.3°C to 12.8°C (-10°F to 55°F)
Condenser Temperature Range	26.7°C to 65.6°C (80°F to 150°F)
Maximum Discharge Temperature	130 °C (265 °F)
Maximum Compression Ratio	8:1
Minimum Airflow Over Compressor	425 cfm @ 6" from Outside Diameter of Housing

Design

Displacement	16.1 cm ³ (0.982 in ³)
Oil Quantity	290 cc
Oil Type	PAG 46 cSt
Compressor Weight	6.4 kg / 14.1 lb

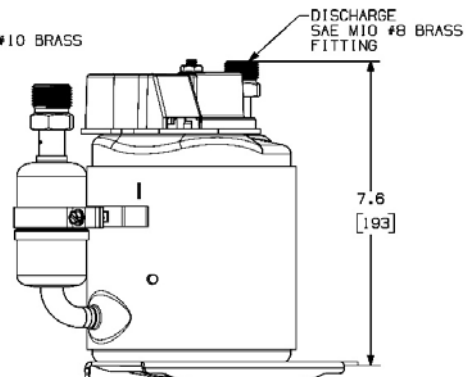
Compressor Dimensions



Packaging Options

- Single Pack (add -SP suffix to part number when ordering)
- Pallet Pack (25 piece multiples)

SIERRA00247



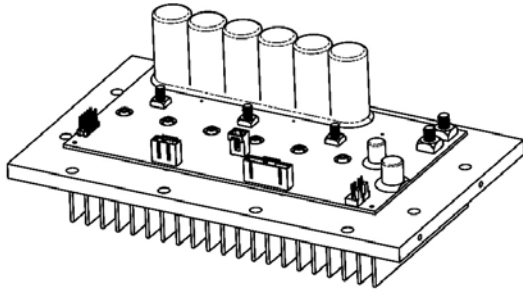
the Sierra

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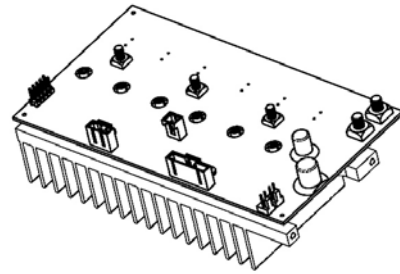


Controller Options:

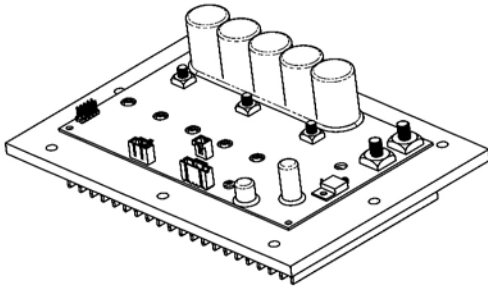
Custom Controller options are also available



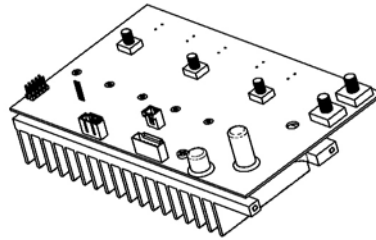
025F0158



025F0152



025F0164



025F0139

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Cooling Capacity (48V) - ARI HBP - R134a / R513A BTU/hr (Watt)

RPM	Evaporator Temperature													
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)							
1800	138 (40)	1341 (393)	1670 (489)	2030 (595)	2582 (756)	2980 (873)	4121 (1207)							
2400	923 (270)	2446 (716)	2963 (868)	3532 (1034)	4311 (1263)	4830 (1415)	6227 (1824)							
3100	1492 (437)	3388 (992)	4125 (1208)	4937 (1446)	5982 (1752)	6642 (1945)	8338 (2442)							
3800	1864 (546)	4133 (1210)	5091 (1491)	6144 (1800)	7455 (2183)	8256 (2418)	10252 (3002)							

Power Consumption (48V) - ARI HBP - R134a / R513A Watt Current (48V) - ARI HBP - R134a / R513A Amp

RPM	Evaporator Temperature								Evaporator Temperature						
	-10°F	10°F	20°F	30°F	40°F	45°F	55°F	-10°F	10°F	20°F	30°F	40°F	45°F	55°F	
1800	100	155	179	202	225	236	259	2.08	3.23	3.74	4.21	4.68	4.91	5.39	
2400	271	338	369	398	427	441	471	5.64	7.05	7.68	8.29	8.89	9.19	9.81	
3100	414	501	541	580	618	638	677	8.62	10.43	11.27	12.08	12.88	13.29	14.11	
3800	522	633	686	737	788	814	866	10.87	13.19	14.28	15.35	16.42	16.95	18.04	

Efficiency (48V) - ARI HBP - R134a / R513A BTU/hr/W (W/W)

RPM	Evaporator Temperature													
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)							
1800	1.38 (0.40)	8.64 (2.53)	9.31 (2.73)	10.04 (2.94)	11.49 (3.37)	12.64 (3.70)	15.92 (4.66)							
2400	3.41 (1.00)	7.23 (2.12)	8.03 (2.35)	8.87 (2.60)	10.10 (2.96)	10.95 (3.21)	13.23 (3.87)							
3100	3.61 (1.06)	6.77 (1.98)	7.63 (2.23)	8.51 (2.49)	9.67 (2.83)	10.41 (3.05)	12.31 (3.60)							
3800	3.57 (1.05)	6.53 (1.91)	7.42 (2.17)	8.34 (2.44)	9.46 (2.77)	10.15 (2.97)	11.84 (3.47)							

* all points are at 35°C (95°F) ambient temperature, 18.33°C (65°F) suction, 8.33°C (15°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (48V) - ARI HBP - R134a / R513A

Coefficient	Capacity (BTU/Hr)	Power (Watts)	Current (Amperes)	Mass Flow (Lbs/Hr)
C1	1.140518E+04	-2.015925E+03	-4.199843E+01	-1.543341E+01
C2	5.965697E+00	6.865657E-01	1.430345E-02	3.315062E-02
C3	-9.592846E-04	-1.310048E-04	-2.729267E-06	-5.081177E-06
C4	9.009947E-08	1.316817E-08	2.743368E-10	8.132811E-10
C5	-4.019977E+02	-1.341039E+01	-2.793832E-01	-9.643178E+00
C6	-1.037918E+00	-1.975286E-02	-4.115180E-04	4.316687E-03
C7	2.671929E-02	1.272309E-04	2.650644E-06	2.402556E-04
C8	-4.747801E+02	3.486094E+01	7.262696E-01	-1.711205E-01
C9	4.604004E+00	-2.933382E-01	-6.111212E-03	1.205062E-03
C10	-1.468673E-02	7.315007E-04	1.523960E-05	-1.597854E-05
C11	-1.227511E-03	-1.298793E-05	-2.705819E-07	-3.027719E-05
C12	1.354330E-07	7.680608E-09	1.600127E-10	3.228039E-09
C13	-4.509764E-06	2.014849E-07	4.197602E-09	-2.958818E-09
C14	3.833090E-07	-1.885172E-07	-3.927442E-09	1.766610E-08
C15	1.797201E-01	4.790884E-03	9.981009E-05	3.768045E-03
C16	-2.121274E-02	-1.707334E-03	-3.556946E-05	-2.870829E-05
C17	4.084848E+00	9.398595E-02	1.958041E-03	1.086887E-01
C18	-1.760643E-05	-7.343792E-07	-1.529957E-08	-3.875567E-07
C19	7.475811E-04	-2.560292E-05	-5.333941E-07	4.037781E-06
C20	-6.129555E-07	-1.873690E-07	-3.903520E-09	-3.690946E-08
C21	8.960189E-05	1.819563E-05	3.790757E-07	1.288354E-06
C22	-5.366697E-03	3.484980E-05	7.260374E-07	-1.318685E-04
C23	-7.067377E-03	1.918953E-04	3.997820E-06	-2.426728E-04

Performance Equation

$$Y = C_1 + C_2 X_1 + C_3 X_1^2 + C_4 X_1^3 + C_5 X_2 + C_6 X_2^2 + C_7 X_2^3 + C_8 X_3 + C_9 X_3^2 + C_{10} X_3^3 + C_{11} X_1 X_2 X_3 + C_{12} X_1^2 X_2 X_3 + C_{13} X_1 X_2^2 X_3 + C_{14} X_1 X_2 X_3^2 + C_{15} X_1 X_2^2 X_3 + C_{16} X_1 X_3^2 + C_{17} X_2 X_3 + C_{18} X_1^2 X_2 + C_{19} X_1 X_2^2 + C_{20} X_1^2 X_3 + C_{21} X_1 X_3^2 + C_{22} X_2^2 X_3 + C_{23} X_2 X_3^2$$

$X_1 = \text{RPM}$
 $X_2 = E_t \text{ (°F)}$
 $X_3 = C_t \text{ (°F)}$

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Cooling Capacity (48V) - ARI HBP - R1234yf BTU/hr (Watt)

RPM	Evaporator Temperature												
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)						
1800	129 (38)	1259 (369)	1568 (459)	1906 (558)	2424 (710)	2798 (819)	3868 (1133)						
2500	961 (281)	2440 (715)	2956 (866)	3522 (1031)	4289 (1256)	4795 (1404)	6147 (1800)						
3100	1401 (410)	3180 (931)	3873 (1134)	4634 (1357)	5615 (1645)	6235 (1826)	7827 (2292)						
3800	1750 (513)	3880 (1136)	4779 (1400)	5768 (1689)	6998 (2050)	7750 (2270)	9624 (2819)						

Power Consumption (48V) - ARI HBP - R1234yf Watt Current (48V) - ARI HBP - R1234yf Amp

RPM	Evaporator Temperature							Evaporator Temperature						
	-10°F	10°F	20°F	30°F	40°F	45°F	55°F	-10°F	10°F	20°F	30°F	40°F	45°F	55°F
1800	104	162	188	212	235	247	271	2.17	3.38	3.91	4.41	4.89	5.14	5.64
2500	308	381	414	446	477	493	525	6.41	7.94	8.63	9.29	9.95	10.28	10.95
3100	433	523	566	606	647	667	708	9.01	10.91	11.78	12.63	13.47	13.90	14.76
3800	546	662	717	771	824	851	905	11.37	13.79	14.94	16.06	17.17	17.73	18.86

Efficiency (48V) - ARI HBP - R1234yf BTU/hr/W (W/W)

RPM	Evaporator Temperature												
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)						
1800	1.24 (0.36)	7.76 (2.27)	8.36 (2.45)	9.01 (2.64)	10.32 (3.02)	11.34 (3.32)	14.29 (4.18)						
2500	3.12 (0.91)	6.40 (1.88)	7.14 (2.09)	7.89 (2.31)	8.98 (2.63)	9.72 (2.85)	11.70 (3.43)						
3100	3.24 (0.95)	6.08 (1.78)	6.85 (2.01)	7.64 (2.24)	8.68 (2.54)	9.35 (2.74)	11.05 (3.24)						
3800	3.21 (0.94)	5.86 (1.72)	6.66 (1.95)	7.48 (2.19)	8.49 (2.49)	9.11 (2.67)	10.63 (3.11)						

* all points are at 35°C (95°F) ambient temperature, 18.33°C (65°F) suction, 8.33°C (15°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (48V) - ARI HBP - R1234yf

Coefficient	Capacity (BTU/Hr)	Power (Watts)	Current (Amperes)	Mass Flow (Lbs/Hr)
C1	1.070664E+04	-2.108123E+03	-4.391923E+01	-1.875411E+01
C2	5.600311E+00	7.179658E-01	1.495762E-02	4.028343E-02
C3	-9.005305E-04	-1.369964E-04	-2.854091E-06	-6.174460E-06
C4	8.458107E-08	1.377041E-08	2.868836E-10	9.882694E-10
C5	-3.773762E+02	-1.402372E+01	-2.921608E-01	-1.171804E+01
C6	-9.743476E-01	-2.065626E-02	-4.303388E-04	5.245480E-03
C7	2.508279E-02	1.330498E-04	2.771871E-06	2.919498E-04
C8	-4.457008E+02	3.645531E+01	7.594856E-01	-2.079394E-01
C9	4.322019E+00	-3.067540E-01	-6.390708E-03	1.464347E-03
C10	-1.378720E-02	7.649559E-04	1.593658E-05	-1.941653E-05
C11	-1.152328E-03	-1.358193E-05	-2.829570E-07	-3.679174E-05
C12	1.271380E-07	8.031881E-09	1.673309E-10	3.922595E-09
C13	-4.233551E-06	2.106998E-07	4.389580E-09	-3.595447E-09
C14	3.598322E-07	-1.971391E-07	-4.107064E-09	2.146720E-08
C15	1.687126E-01	5.009996E-03	1.043749E-04	4.578790E-03
C16	-1.991350E-02	-1.785419E-03	-3.719623E-05	-3.488526E-05
C17	3.834660E+00	9.828440E-02	2.047592E-03	1.320745E-01
C18	-1.652807E-05	-7.679661E-07	-1.599929E-08	-4.709448E-07
C19	7.017934E-04	-2.677387E-05	-5.577889E-07	4.906564E-06
C20	-5.754133E-07	-1.959383E-07	-4.082048E-09	-4.485103E-08
C21	8.411397E-05	1.902781E-05	3.964127E-07	1.565560E-06
C22	-5.037998E-03	3.644365E-05	7.592428E-07	-1.602418E-04
C23	-6.634515E-03	2.006717E-04	4.180660E-06	-2.948871E-04

Performance Equation

$$Y = C_1 + C_2 X_1 + C_3 X_1^2 + C_4 X_1^3 + C_5 X_2 + C_6 X_2^2 + C_7 X_2^3 + C_8 X_3 + C_9 X_3^2 + C_{10} X_3^3 + C_{11} X_1 X_2 X_3 + C_{12} X_1^2 X_2 X_3 + C_{13} X_1 X_2^2 X_3 + C_{14} X_1 X_2 X_3^2 + C_{15} X_1 X_2^2 X_3 + C_{16} X_1 X_3^2 + C_{17} X_2 X_3 + C_{18} X_1^2 X_2 + C_{19} X_1 X_2^2 + C_{20} X_1^2 X_3 + C_{21} X_1 X_3^2 + C_{22} X_2^2 X_3 + C_{23} X_2 X_3^2$$

$X_1 = \text{RPM}$
 $X_2 = E_t \text{ (°F)}$
 $X_3 = C_t \text{ (°F)}$

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Cooling Capacity (72V) - ARI HBP - R134a / R513A BTU/hr (Watt)

RPM	Evaporator Temperature													
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)							
3200	1553	3502	4271	5117	6200	6880	8619							
4000	1960	4335	5356	6479	7865	8707	10788							
4800	2422	5223	6495	7896	9585	10588	13011							
5700	3350	6630	8186	9898	11929	13114	15922							

Power Consumption (72V) - ARI HBP - R134a / R513A Watt Current (72V) - ARI HBP - R134a / R513A Amp

RPM	Evaporator Temperature								Evaporator Temperature						
	-10°F	10°F	20°F	30°F	40°F	45°F	55°F	-10°F	10°F	20°F	30°F	40°F	45°F	55°F	
3200	431	521	562	603	643	664	705	5.98	7.23	7.81	8.38	8.94	9.22	9.79	
4000	550	669	726	781	836	864	920	7.64	9.30	10.08	10.85	11.62	12.00	12.78	
4800	670	825	899	973	1046	1083	1158	9.30	11.46	12.49	13.51	14.53	15.04	16.08	
5700	855	1058	1157	1255	1353	1402	1502	11.87	14.70	16.07	17.43	18.79	19.48	20.85	

Efficiency (72V) - ARI HBP - R134a / R513A BTU/hr/W (W/W)

RPM	Evaporator Temperature													
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)							
3200	3.61	6.73	7.59	8.48	9.64	10.37	12.23							
4000	3.56	6.48	7.38	8.29	9.40	10.08	11.72							
4800	3.62	6.33	7.22	8.12	9.16	9.78	11.24							
5700	3.92	6.27	7.07	7.89	8.82	9.35	10.60							

* all points are at 35°C (95°F) ambient temperature, 18.33°C (65°F) suction, 8.33°C (15°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (72V) - ARI HBP - R134a / R513A

Coefficient	Capacity (BTU/Hr)	Power (Watts)	Current (Amperes)	Mass Flow (Lbs/Hr)
C1	1.140518E+04	-2.015925E+03	-2.799895E+01	-1.543341E+01
C2	5.965697E+00	6.865657E-01	9.535635E-03	3.315062E-02
C3	-9.592846E-04	-1.310048E-04	-1.819512E-06	-5.081177E-06
C4	9.009947E-08	1.316817E-08	1.828912E-10	8.132811E-10
C5	-4.019977E+02	-1.341039E+01	-1.862555E-01	-9.643178E+00
C6	-1.037918E+00	-1.975286E-02	-2.743453E-04	4.316687E-03
C7	2.671929E-02	1.272309E-04	1.767096E-06	2.402556E-04
C8	-4.747801E+02	3.486094E+01	4.841797E-01	-1.711205E-01
C9	4.604004E+00	-2.933382E-01	-4.074141E-03	1.205062E-03
C10	-1.468673E-02	7.315007E-04	1.015973E-05	-1.597854E-05
C11	-1.227511E-03	-1.298793E-05	-1.803879E-07	-3.027719E-05
C12	1.354330E-07	7.680608E-09	1.066751E-10	3.228039E-09
C13	-4.509764E-06	2.014849E-07	2.798402E-09	-2.958818E-09
C14	3.833090E-07	-1.885172E-07	-2.618295E-09	1.766610E-08
C15	1.797201E-01	4.790884E-03	6.654006E-05	3.768045E-03
C16	-2.121274E-02	-1.707334E-03	-2.371297E-05	-2.870829E-05
C17	4.084848E+00	9.398595E-02	1.305360E-03	1.086887E-01
C18	-1.760643E-05	-7.343792E-07	-1.019971E-08	-3.875567E-07
C19	7.475811E-04	-2.560292E-05	-3.555961E-07	4.037781E-06
C20	-6.129555E-07	-1.873690E-07	-2.602347E-09	-3.690946E-08
C21	8.960189E-05	1.819563E-05	2.527171E-07	1.288354E-06
C22	-5.366697E-03	3.484980E-05	4.840249E-07	-1.318685E-04
C23	-7.067377E-03	1.918953E-04	2.665213E-06	-2.426728E-04

Performance Equation

$$Y = C_1 + C_2 X_1 + C_3 X_1^2 + C_4 X_1^3 + C_5 X_2 + C_6 X_2^2 + C_7 X_2^3 + C_8 X_3 + C_9 X_3^2 + C_{10} X_3^3 + C_{11} X_1 X_2 X_3 + C_{12} X_1^2 X_2 X_3 + C_{13} X_1 X_2^2 X_3 + C_{14} X_1 X_2 X_3^2 + C_{15} X_1 X_2^2 X_3 + C_{16} X_1 X_3^2 + C_{17} X_2 X_3 + C_{18} X_1^2 X_2 + C_{19} X_1 X_2^2 + C_{20} X_1^2 X_3 + C_{21} X_1 X_3^2 + C_{22} X_2^2 X_3 + C_{23} X_2 X_3^2$$

$X_1 = \text{RPM}$
 $X_2 = E_t \text{ (°F)}$
 $X_3 = C_t \text{ (°F)}$

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Cooling Capacity (72V) - ARI HBP - R1234yf BTU/hr (Watt)

RPM	Evaporator Temperature												
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)						
3200	1458	3288	4009	4803	5820	6459	8091						
4000	1840	4070	5028	6082	7384	8174	10127						
4800	2273	4903	6097	7412	8998	9940	12214						
5700	3145	6224	7684	9292	11198	12311	14946						

Power Consumption (72V) - ARI HBP - R1234yf Watt Current (72V) - ARI HBP - R1234yf Amp

RPM	Evaporator Temperature							Evaporator Temperature						
	-10°F	10°F	20°F	30°F	40°F	45°F	55°F	-10°F	10°F	20°F	30°F	40°F	45°F	55°F
3200	450	545	588	631	673	694	737	6.26	7.56	8.17	8.76	9.34	9.64	10.24
4000	575	700	759	817	875	904	962	7.99	9.72	10.54	11.35	12.15	12.55	13.37
4800	701	863	940	1017	1094	1133	1211	9.73	11.98	13.06	14.13	15.20	15.73	16.81
5700	894	1107	1210	1313	1415	1466	1570	12.42	15.37	16.81	18.23	19.65	20.37	21.81

Efficiency (72V) - ARI HBP - R1234yf BTU/hr/W (W/W)

RPM	Evaporator Temperature												
	-10°F (-23°C)	10°F (-12°C)	20°F (-7°C)	30°F (-1°C)	40°F (4°C)	45°F (7°C)	55°F (13°C)						
3200	3.24	6.04	6.82	7.62	8.65	9.31	10.98						
4000	3.20	5.81	6.62	7.44	8.44	9.05	10.52						
4800	3.25	5.68	6.48	7.29	8.22	8.78	10.09						
5700	3.52	5.62	6.35	7.08	7.91	8.40	9.52						

* all points are at 35°C (95°F) ambient temperature, 18.33°C (65°F) suction, 8.33°C (15°F) subcooling, 54.4°C (130°F) condenser

Performance Coefficients (72V) - ARI HBP - R1234yf

Coefficient	Capacity (BTU/Hr)	Power (Watts)	Current (Amperes)	Mass Flow (Lbs/Hr)
C1	1.070664E+04	-2.108123E+03	-2.927949E+01	-1.875411E+01
C2	5.600311E+00	7.179658E-01	9.971748E-03	4.028343E-02
C3	-9.005305E-04	-1.369964E-04	-1.902727E-06	-6.174460E-06
C4	8.458107E-08	1.377041E-08	1.912558E-10	9.882694E-10
C5	-3.773762E+02	-1.402372E+01	-1.947739E-01	-1.171804E+01
C6	-9.743476E-01	-2.065626E-02	-2.868925E-04	5.245480E-03
C7	2.508279E-02	1.330498E-04	1.847914E-06	2.919498E-04
C8	-4.457008E+02	3.645531E+01	5.063237E-01	-2.079394E-01
C9	4.322019E+00	-3.067540E-01	-4.260472E-03	1.464347E-03
C10	-1.378720E-02	7.649559E-04	1.062439E-05	-1.941653E-05
C11	-1.152328E-03	-1.358193E-05	-1.886380E-07	-3.679174E-05
C12	1.271380E-07	8.031881E-09	1.115539E-10	3.922595E-09
C13	-4.233551E-06	2.106998E-07	2.926387E-09	-3.595447E-09
C14	3.598322E-07	-1.971391E-07	-2.738042E-09	2.146720E-08
C15	1.687126E-01	5.009996E-03	6.958327E-05	4.578790E-03
C16	-1.991350E-02	-1.785419E-03	-2.479748E-05	-3.488526E-05
C17	3.834660E+00	9.828440E-02	1.365061E-03	1.320745E-01
C18	-1.652807E-05	-7.679661E-07	-1.066620E-08	-4.709448E-07
C19	7.017934E-04	-2.677387E-05	-3.718593E-07	4.906564E-06
C20	-5.754133E-07	-1.959383E-07	-2.721365E-09	-4.485103E-08
C21	8.411397E-05	1.902781E-05	2.642752E-07	1.565560E-06
C22	-5.037998E-03	3.644365E-05	5.061619E-07	-1.602418E-04
C23	-6.634515E-03	2.006717E-04	2.787107E-06	-2.948871E-04

Performance Equation

$$Y = C_1 + C_2 X_1 + C_3 X_1^2 + C_4 X_1^3 + C_5 X_2 + C_6 X_2^2 + C_7 X_2^3 + C_8 X_3 + C_9 X_3^2 + C_{10} X_3^3 + C_{11} X_1 X_2 X_3 + C_{12} X_1^2 X_2 X_3 + C_{13} X_1 X_2^2 X_3 + C_{14} X_1 X_2 X_3^2 + C_{15} X_1 X_2^2 X_3 + C_{16} X_1 X_3^2 + C_{17} X_2 X_3 + C_{18} X_1^2 X_2 + C_{19} X_1 X_2^2 + C_{20} X_1^2 X_3 + C_{21} X_1 X_3^2 + C_{22} X_2^2 X_3 + C_{23} X_2 X_3^2$$

$X_1 = \text{RPM}$
 $X_2 = E_t \text{ (°F)}$
 $X_3 = C_t \text{ (°F)}$